

WHAT IS CLAIMED IS:

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1. A DNA segment comprising an isolated *MTAP* gene.
 2. The DNA segment of claim 1, comprising an isolated human *MTAP* gene.
 3. The DNA segment of claim 1, comprising an *MTAP* gene that encodes an MTAP protein or peptide that includes a contiguous amino acid sequence from SEQ ID NO:2.
 4. The DNA segment of claim 1, comprising an *MTAP* gene that includes a contiguous nucleic acid sequence from between position 122 and position 970 of SEQ ID NO:1.
 5. The DNA segment of claim 1, comprising an *MTAP* gene that encodes an MTAP peptide of from about 15 to about 150 amino acids in length.
 6. The DNA segment of claim 1, comprising an *MTAP* gene that encodes an MTAP protein of about 283 amino acids in length.

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7. An isolated nucleic acid segment characterized as:

- (a) a nucleic acid segment comprising a sequence region that consists of at least 14 contiguous nucleotides that have the same sequence as, or are complementary to, 14 contiguous nucleotides of SEQ ID NO:1; or
- (b) a nucleic acid segment of from 14 to about 10,000 nucleotides in length that hybridizes to the nucleic acid segment of SEQ ID NO:1, or the complement thereof, under standard hybridization conditions.

8. The nucleic acid segment of claim 7, wherein the segment comprises a sequence region of at least 14 contiguous nucleotides from SEQ ID NO:1, or the complement thereof.

9. The nucleic acid segment of claim 7, wherein the segment hybridizes to the nucleic acid segment of SEQ ID NO:1, or the complement thereof.

10. The nucleic acid segment of claim 7, wherein the segment comprises a sequence region of at least about 20 nucleotides; or wherein the segment is about 20 nucleotides in length.

11. The nucleic acid segment of claim 7, wherein the segment is up to 10,000 basepairs in length.

12. The nucleic acid segment of claim 11, wherein the segment is up to 5,000 basepairs in length.

13. A recombinant host cell comprising a DNA segment that comprises an isolated *MTAP* gene.

14. A method of using a DNA segment that includes an isolated *MTAP* gene, comprising the steps of:

- (a) preparing a recombinant vector in which an *MTAP*-encoding DNA segment is positioned under the control of a promoter;
- (b) introducing said recombinant vector into a recombinant host cell;
- (c) culturing the recombinant host cell under conditions effective to allow expression of an encoded *MTAP* protein or peptide; and
- (d) collecting said expressed *MTAP* protein or peptide.

15. A method for detecting an *MTAP* gene, comprising the steps of:

- (a) obtaining sample nucleic acids suspected of containing an *MTAP* gene;
- (b) contacting said sample nucleic acids with an isolated *MTAP* nucleic acid segment under conditions effective to allow hybridization of substantially complementary nucleic acids; and
- (c) detecting the hybridized complementary nucleic acids thus formed.

16. The method of claim 15, wherein the sample nucleic acids contacted are located within a cell.

17. The method of claim 15, wherein the sample nucleic acids are separated from a cell prior to contact.

18. The method of claim 15, wherein the sample nucleic acids are DNA.

19. The method of claim 15, wherein the sample nucleic acids are RNA.

20. The method of claim 15, wherein the isolated *MTAP* nucleic acid segment comprises a detectable label and the hybridized complementary nucleic acids are detected by detecting said label.

21. The method of claim 20, wherein the nucleic acid segment comprises a radio-, enzymatic or fluorescent label.

22. A nucleic acid detection kit comprising, in suitable container means, an isolated *MTAP* nucleic acid segment and a detection reagent.

23. The nucleic acid detection kit of claim 22, further comprising a restriction enzyme.

24. The nucleic acid detection kit of claim 22, comprising two *MTAP* nucleic acid segments of between about 14 and about 40 nucleotides in length.

25. The nucleic acid detection kit of claim 22, wherein the detection reagent is a detectable label that is linked to said *MTAP* nucleic acid segment.

26. A purified antibody that binds to a MTAP protein or peptide.

27. The antibody of claim 26, wherein the antibody is linked to a detectable label.

28. The antibody of claim 27, wherein the antibody is linked to a radioactive label, a fluorogenic label, a nuclear magnetic spin resonance label, biotin or an enzyme that generates a colored product upon contact with a chromogenic substrate.

29. A method for detecting MTAP peptide in a biological sample, comprising the steps of:

- (a) obtaining a biological sample suspected of containing MTAP peptide;
- (b) contacting said sample with a first antibody that binds to an MTAP protein or peptide, under conditions effective to allow the formation of immune complexes; and
- (c) detecting the immune complexes so formed.

30. An immunodetection kit comprising, in suitable container means, an MTAP protein or peptide, or a first antibody that binds to an MTAP protein or peptide, and an immunodetection reagent.

31. The immunodetection kit of claim 30, wherein the immunodetection reagent is a detectable label that is linked to said protein, peptide or said first antibody.

32. The immunodetection kit of claim 30, wherein the immunodetection reagent is a detectable label that is linked to a second antibody that has binding affinity for said protein, peptide or said first antibody.

33. The immunodetection kit of claim 31, wherein the immunodetection reagent is a detectable label that is linked to a second antibody that has binding affinity for a human antibody.

34. A tumor repressor gene that maps to 9p21-p22 that promotes melanoma senescence.

35. A tumor repressor gene that maps to 9p21-p22 that suppresses glioma cell tumor generation.

36. An isolated DNA segment identified as T98G.

37. A method of distinguishing a tumor type comprising determining the pattern of 9p homozygous deletions and associating the pattern with a pattern obtained from a tumor sought to be identified.

38. The method of claim 37, wherein the tumor type is identified as a leukemia, glioma, melanoma, brain cancer, lung cancer, pancreatic cancer, bladder cancer, or breast cancer.